DATE OF ISSUE : 2010. 01. 05

SPECIFICATION

MODEL : SPMRDT3215A0

Approved rank : V_F(E1,E2,E3,E4), λ_D(C1,C2), I_V(AB,BA,BB,CA)

RED LED

CUSTOMER :	
CHECKED	APPROVED

SAMSUNG LED			
DRAWN	CHECKED		APPROVED
	영업	품질	

SAMSUNG LED CO., LTD.
314. MAETAN 3-DONG, YEONGTONG-GU,
SUWON-SI,GYEONGGI-DO,KOREA,443-743

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1. Product Outline

1) Feature

. Lead Frame Type LED Package (3.5 * 2.8 * t 1.9 mm)

. Beam Angle (△θ : 120 °)

. AlGaInP/AlN Chip & Long Time Reliability

2) Applications

. Automotive, Indoor, Outdoor Display and etc.

2. Absolute Maximum Rating

1). Operation Forward Current Per Chip ..... 70 ㎃

2). Peak Pulsed Forward Current Per Chip ..... 100 ㎃
(Duty 33/1000 Pulse Width 3.03 msec)

3). Reverse Voltage ..... 5 V

4). Thermal Resistance(Rth junction/solder point)..... 70 K/W
(Mount on metal PCB size 16*16*1.6(t) mm^3)

5). Junction Temperature (T_j)..... 125℃

6). Operating Temperature Range (T_{opr}) ..... -40℃ ~ 100℃

7). Storage Temperature Range (T_{stg}) ..... -40℃ ~ 100℃

3. Characteristics

Electrical/ Optical Characteristics

(Ta : 25 ℃)

Item	Symbol	Conditions	Rank		Min.	Typ.	Max.	Unit
Forward Voltage (*)	V_F	I_F = 50 ㎃	AE	E1	1.90	-	2.05	V
				E2	2.05	-	2.20	
				E3	2.20	-	2.35	
				E4	2.35	-	2.50	
Reverse Current	I_R	V_R = 5 V	-		-	-	10	㎂

Dominant Wavelength

(Ta : 25°C)

Item	Symbol	Condition	Rank		Model Name	Min.	Typ.	Max.	Unit
Dominant Wavelength (*)	λ_D	I_F = 50 ㎃	FC	C1	SPMRDT3215A0AEC1SC	615	-	619.5	nm
				C2	SPMRDT3215A0AEC2SC	619.5	-	624	

Luminous Intensity

(Ta : 25 ℃)

Item	Symbol	Condition	Rank		Min.	Typ.	Max.	Unit
Luminous Intensity (*)	I_V	I_F = 50 ㎃	SC	AB	1400	-	1800	mcd
				BA	1800	-	2240	
				BB	2240	-	2800	
				CA	2800	-	3550	

* Tolerance : V_F ; ±0.1V, λ_D ; ±2㎚, I_V ; ±10%

* Luminous Flux : Typ. 5000 mlm

* Luminous intensity measuring equipment : CAS140CT

※ Approved Rank

V_F	λ_D	I_v
E1, E2, E3, E4	C1, C2	AB,BA,BB,CA

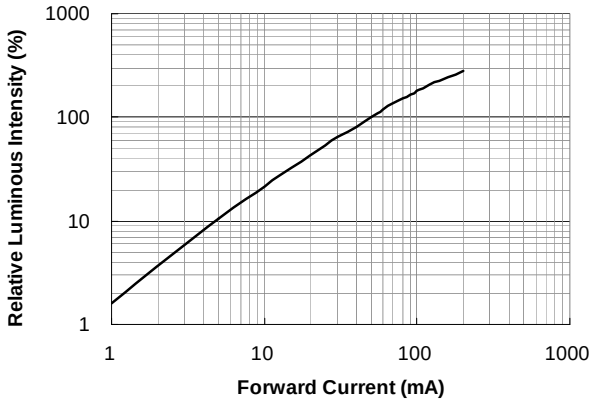
* Each reel contains only one of the E1, E2, E3 or E4 a segment (1/4) of the V_F rank.
* Each reel contains only one of the C1, C2 a segment (1/2) of the λ_D rank.
* Each reel contains only one of the AB, BA, BB or CA a segment (1/4) of the I_v rank.

4. Typical Characteristics Graph

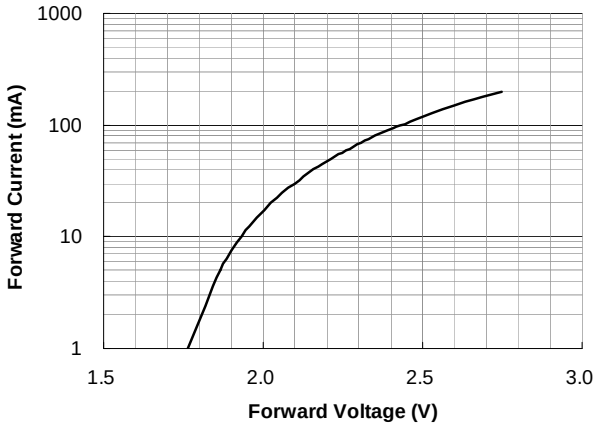
* These graphs show typical values.

(Ta : 25°C)

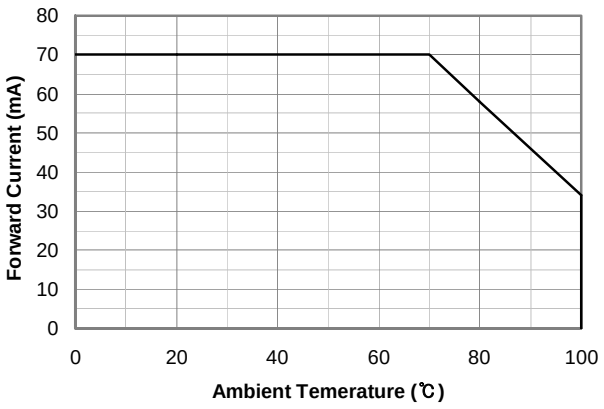
Relative Luminous Intensity vs. Forward Current



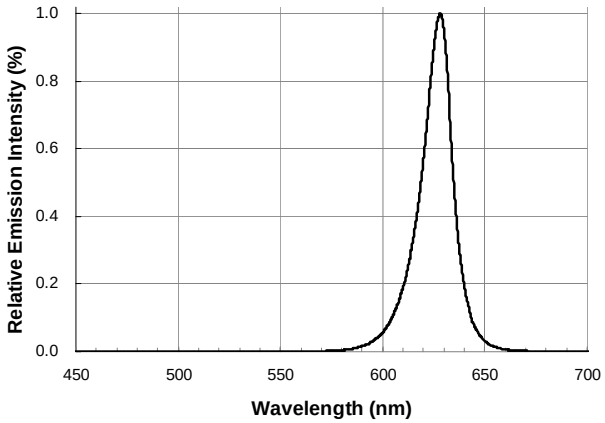
Forward Current vs. Forward Voltage



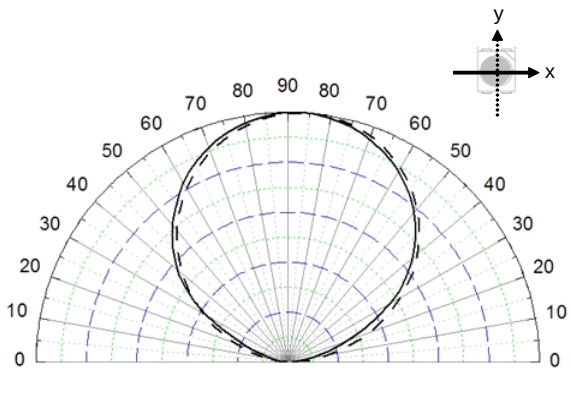
Forward Current Derating Curve



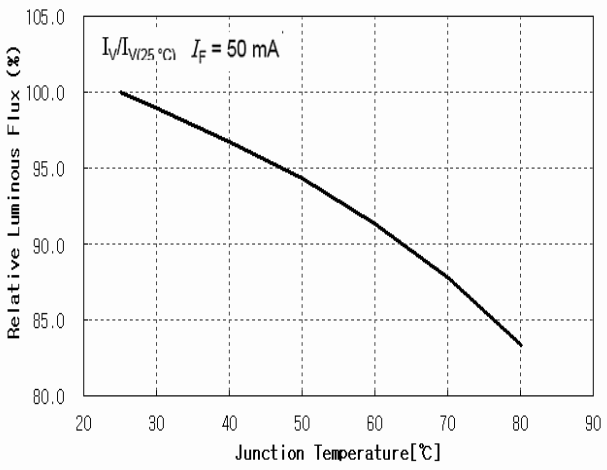
Spectrum Distribution



Radiation Diagram

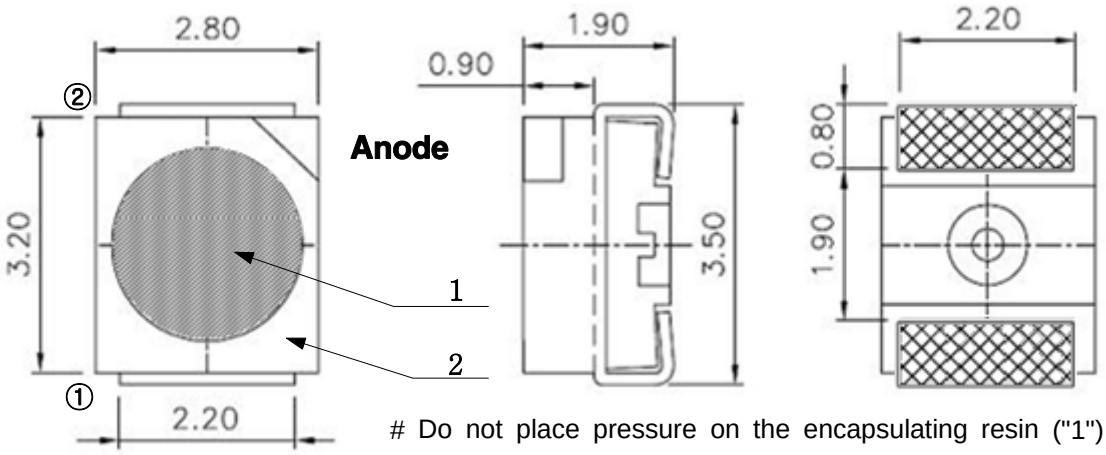


Relative Luminous Flux vs. Ambient Temp.

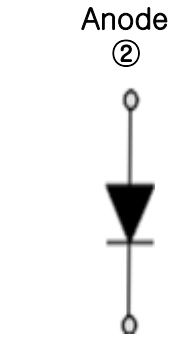


5. LED Package Outline Dimensions

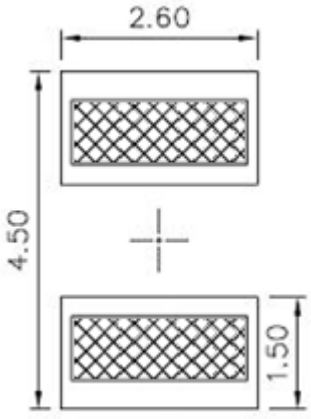
unit:mm
Tolerance:±0.15



Do not place pressure on the encapsulating resin ("1")
The maximum compressing force is 15N on the polymer ("2")

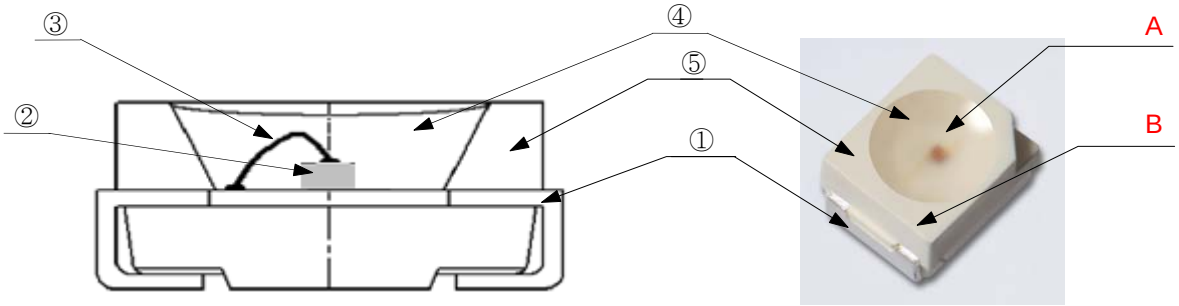


Circuit Diagram



Land Layout

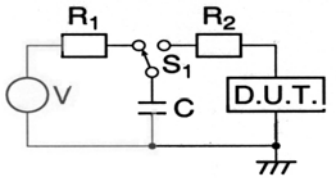
Do not place pressure on the encapsulating resin ("A")
The maximum compressing force is 15N on the polymer ("B")



NUMBER	ITEM	MATERIAL
①	FRAME	Copper Frame(Silver Plated)
②	LED CHIP	AlGaInP/AlN
③	WIRE	Gold Wire
④	RESIN	Silicone
⑤	PACKAGE	Heat-resistant Polymer

6. Reliability Test Items and Conditions

1) Test Items

Test Item	Test Conditions	Hours/Cycles	Sample
Room Temp. Life Test [JESD22-A108]	25℃±3℃, DC 70 ㎃	1000 hr	0/3*30
High Temp. Humidity Life Test [JESD22-A101]	85℃±3℃, 85%±2%RH, DC 5 ㎃	1000 hr	0/3*30
High Temp. Life Test [JESD22-A108]	85℃±3℃, DC 50 ㎃	1000 hr	0/50
	100℃±3℃, DC 35 ㎃	1000 hr	0/50
Low Temp. Life Test [JESD22-A108]	-40℃±3℃, DC 70 ㎃	1000 hr	0/50
High Temp. Storage	100℃±3℃	1000 hr	0/50
Low Temp. Storage	-40℃±3℃,	1000 hr	0/50
High Temp. Humidity Storage	85℃±3℃, 85%±2%RH	1000 hr	0/50
Thermal Shock [JESD22-A104]	-40℃ ~ 100℃ [15min, 15min]	1000 cycles	0/3*30
Power Temp. Cycle [JESD22-A105]	-40℃/85℃, on/off 5min, DC 50 ㎃	1000 hr	0/50
Temp. Humidity Cycle Test	25℃ ~ 65℃ ~ -10℃ 24hrs/1cycle, 95%RH	1000 hr	0/50
Pulse Life Test [JESD22-A114]	25℃±3℃, I_{FP} 100 ㎃ [Duty 3.3/100 Pulse Width(T) 3.03 msec]	1000 hr	0/50
Reflow Soldering [JESD22-A113]	Peak 260℃±5℃ for 10sec	3 times	0/3*30
ESD(Human Body Model) [JESD22-A114]	ESD 2㎸  -R1:10 ㏁ , R2:1.5 ㏀ , C:100 ㎊	1 time	0/3*30
Mechanical Shock Test [MIL-STD-883 (2002 Con. B)]	3 shocks each X-Y-Z axis, 3000g, 0.3㎳	1 time	0/11
Vibration Test [SAE 575 DEC88 Section 4.1]	10 to 55㎐ , 1㎜ peak-to-peak, 2 minutes per cycles, 60 minutes total duration	1 time	0/11

2) Criteria for Judging the Damage

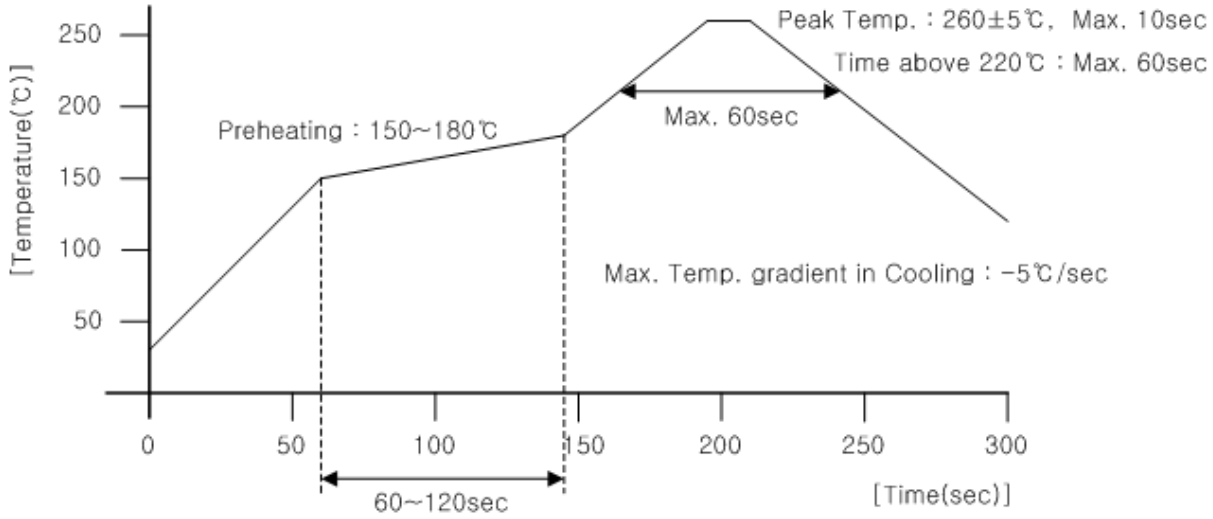
Item	Symbol	Test Condition	Limit	
			Min.	Max.
Forward Voltage	V_F	I_F = 50 mA	-	U.S.L.*1.2
Luminous Intensity	I_V	I_F = 50 mA	L.S.L.*0.7	-

* USL : Upper Standard Level LSL : Lower Standard Level

7. Solder Conditions

1) Reflow Conditions (Pb Free)

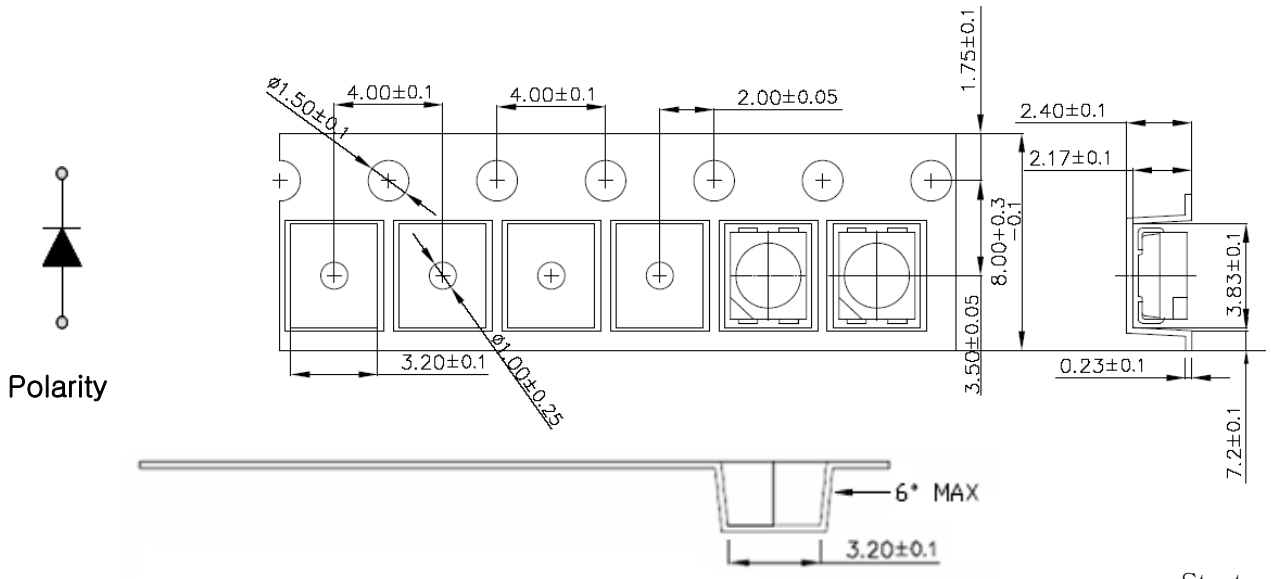
Reflow Frequency : 2 times max.

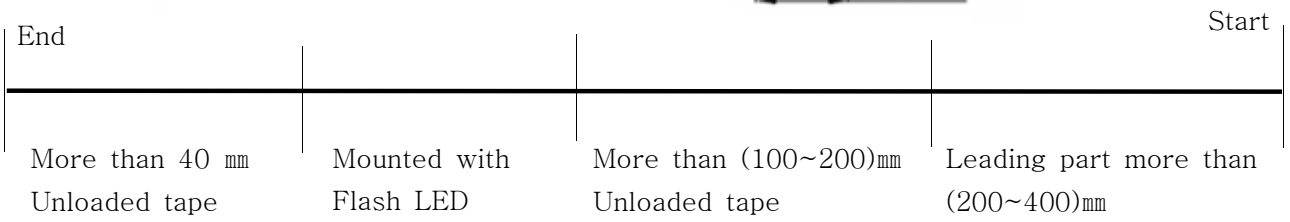


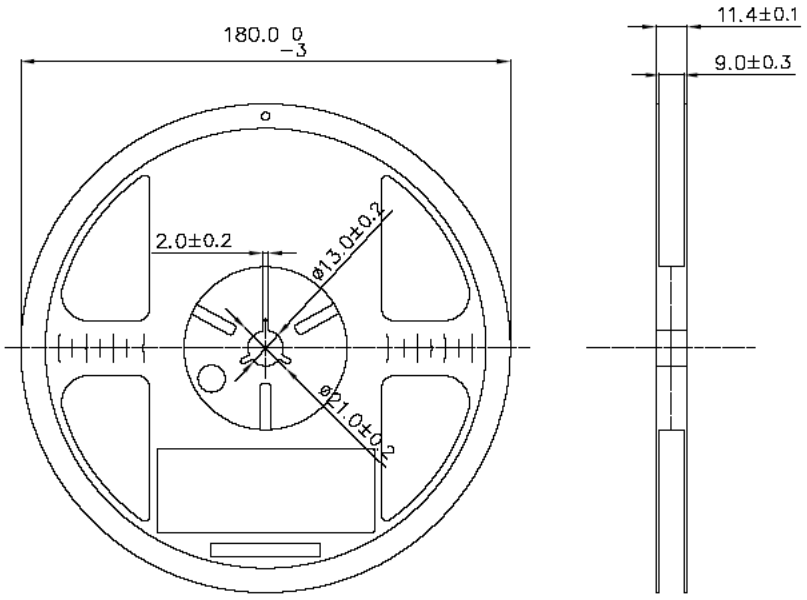
2) For Manual Soldering

Not more than 5 seconds @MAX300℃, under soldering iron.(one time only)

8. Taping Dimension







Tolerance ±0.2 , Unit:㎜

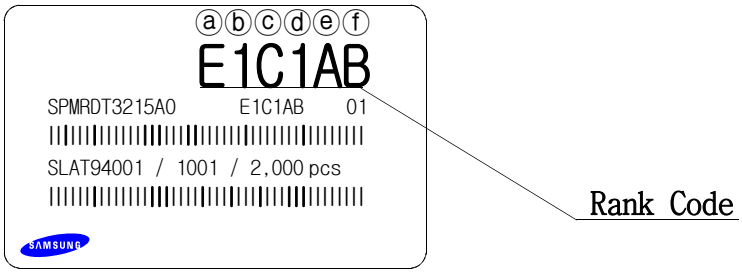
(1) Quantity : The quantity/reel to be 2000pcs.

(2) Cumulative Tolerance : Cumulative tolerance/10 pitches to be ±0.2 ㎜

(3) Adhesion Strength of Cover Tape : Adhesion strength to be 0.1-0.7N when the cover tape is turned off from the carrier tape at 10℃ angle to be the carrier tape.

(4) Packaging : P/N, Manufacturing data code no. and quantity to be indicated on a damp proof package.

9. Label Structure



N.B) Denoted rank is the only example.

Rank Code

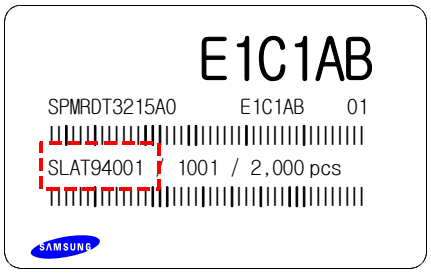
ⓐⓑ : Forward Voltage(V_F) Rank (refer to page. 3)

ⓒⓓ : Wavelength Rank(λ_D) (refer to page. 3)

ⓔⓕ : Luminous Intensity(I_V) Rank (refer to page. 3)

10 Lot Number

The Lot number is composed of the following characters



①②③④⑤⑥⑦⑧⑨ / 1ⓐⓑⓒ / 2,000 PCS

① : Production Site (S:SAMSUNG LED, G: GOSIN CHINA, I: Apro)

② : L (LED)

③ : Product State (A:Normality, B:Bulk, C:First Production, R:Reproduction, S:Sample)

④ : Year (T:2009, U:2010, V:2011...)

⑤ : Month (1 ~ 9, A, B)

⑥ : Day (1 ~ 9, A, B ~ V)

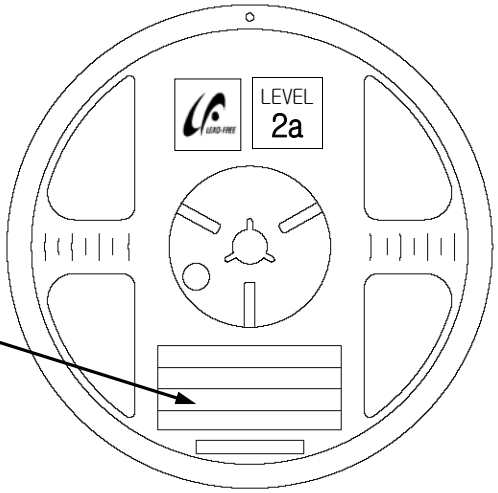
⑦⑧⑨ : SAMSUNG LED Product number (1 ~ 999)

ⓐⓑⓒ : Reel Number (1 ~ 999)

11. Reel Packing Structure

Reel

E1C1AB
SPMRDT3215A0 E1C1AB 01
SLAR94001 / 1001 / 2,000pcs



Aluminum Vinyl Bag

E1C1AB
SPMRDT3215A0 E1C1AB 01
SLAR94001 / 1001 / 2,000pcs

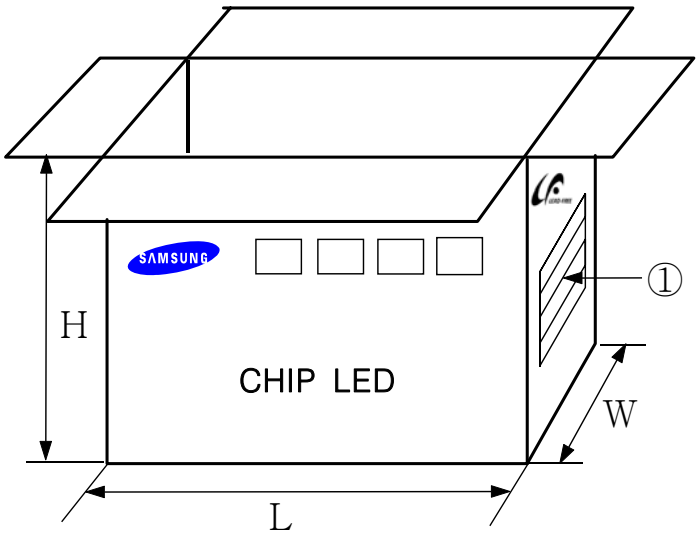
Material : Paper(SW3B(B))

TYPE	SIZE(mm)		
	L	W	H
7inch	245	220	182

① SIDE

E1C1AB
SPMRDT3215A0 E1C1AB 01
SLAR94001 / 1001 / 20,000pcs

[Box Label]



12. Aluminum Vinyl Bag

CAUTION

LEVEL 2a

This bag contains
MOISTURE SENSITIVE DEVICES

1. Shelf life in sealed bag: 12 months at < 40℃ and < 90% relative humidity (RH)
2. Peak package body temperature: 240 ℃
3. After this bag is opened, devices that will be subjected to reflow soldor or other high temperature processes must be:
   a. Mounted within 672 hours at factory conditions of equal to or less than 30℃ /60% RH, or
   b. Stored at < 10% RH
4. Devices require bake, before mounting, if:
   a.Humidity Indicator Card is > 65% when read at 23±5℃, or
   b. 2a is not met.
5. If baking is required, devices must be baked for 1 hours at 60±5℃

Note: if device containers cannot be subjected to high temperature or shorter bake times are desired, reference IPC/JEDEC J-STD-033 for bake procedure,

Bag seal due date: _____
(if blank, see code label)

Note: Level and body temperature by IPC/JEDEC J-STD-020

E1C1AB

SPMRDT3215A0 E1C1AB 01

SLAR94001 / 1001 / 2,000pcs

LEAD-FREE

ATTENTION
OBSERVE PRECAUTIONS FOR HANDLING
ELECTROSTATIC SENSITIVE DEVICES

OTHER

■ 주의 사항

이 알루미늄 지퍼 백은 습기 및 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 개봉 후에는 즉시 솔더 작업을 실시하는 것을 권장합니다.

습기 및 정전기로부터 제품을 보호 하기 위해서 개봉 후 사용하지 않는 자재는 본 팩에 넣어 보관 하시기 바랍니다. 사용하지 않는 자재를 본 팩에 넣을 때는 반드시 동봉된 드라이 팩과 함께 넣고 지퍼부분을 완전하게 밀봉하여 주시기 바랍니다.

■ Important

This Al Zipper bag is designed to protect the enclosed products from moisture and ESD. Once opened, the products should be soldered onto the printed circuit board immediately. When not in use, please do not leave the products unprotected by the Al Zipper Bag. To repack unused products., please ensure the zip-lock is completely sealed with the dry pack left inside.

Silica gel & Humidity Indicator Card in Aluminum Vinyl Bag

13. Precaution for Use

1) For over-current-proof function, customers are recommended to apply resistors to prevent sudden change of the current caused by slight shift of the voltage.

2) This device should not be used in any type of fluid such as water, oil, organic solvent, etc. When washing is required, IPA is recommended to use.

3) When the LEDs illuminate, operating current should be decided after considering the ambient maximum temperature.

4) LEDs must be stored in a clean environment.
If the LEDs are to be stored for 3 months or more after being shipped from SAMSUNG, they should be packed by a sealed container with nitrogen gas injected. (Shelf life of sealed bags: 12 months, temp. 0~40℃, 20~70%RH)

5) After storage bag is open, device subjected to soldering, solder reflow, or other high temperature processes must be:
   a. Mounted within 168 hours (7 days) at an assembly line with a condition of no more than 30℃/60%RH,
   b. Stored at <10% RH

6) Repack unused Products with anti-moisture packing, fold to close any opening and then store in a dry place.

7) Devices require baking before mounting, if humidity card reading is >60% at 23±5℃.

8) Devices must be baked for 24hours at 65±5℃, if baking is required.

9) The LEDs are sensitive to the static electricity and surge. It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs.

   If voltage exceeding the absolute maximum rating is applied to LEDs, it may cause damage or even destruction to LED devices.

   Damaged LEDs may show some unusual characteristics such as increase in leak current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.

14. Hazard Substance Analysis

SGS

Test Report No. F690501/LF-CTSAYAA09-28610 Issued Date: October 19, 2009 Page 1 of 3

To: **SAMSUNG LED CO.,LTD.**
314,Maetan-dong
Yeongtong-gu
Suwon-city
GYEONGGI-DO
Korea

The following merchandise was submitted and identified by the client as :

Product Name	: LED
SGS File No.	: AYAA09-28610
Received Date	: October 14, 2009
Test Performing Date	: October 15, 2009
Test Performed	: SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results	: For further details, please refer to following page(s)

SGS Testing Korea Co. Ltd.

Pluto Kim
Cindy Park
Jinee Song/ Testing Person

Jeff Jang / Chemical Lab Mgr

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 183 days only.

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Member of the SGS Group (Société Générale de Surveillance)

SGS

Test Report No. F690501/LF-CTSAYAA09-28610 Issued Date: October 19, 2009 Page 2 of 3

Sample No. : AYAA09-28610.001

Sample Description : LED

Item No./Part No. : 3528 RED

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321:2008, ICP	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321:2008, ICP	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008, ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321:2008, UV-VIS	1	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.

Halogen Contents

NOTE: (1) N.D. = Not detected.(<MDL)
(2) mg/kg = ppm
(3) MDL = Method Detection Limit
(4) - = No regulation
(5) ** = Qualitative analysis (No Unit)
(6) Negative = Undetectable / Positive = Detectable

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Sample No. : AYAA09-28610.001

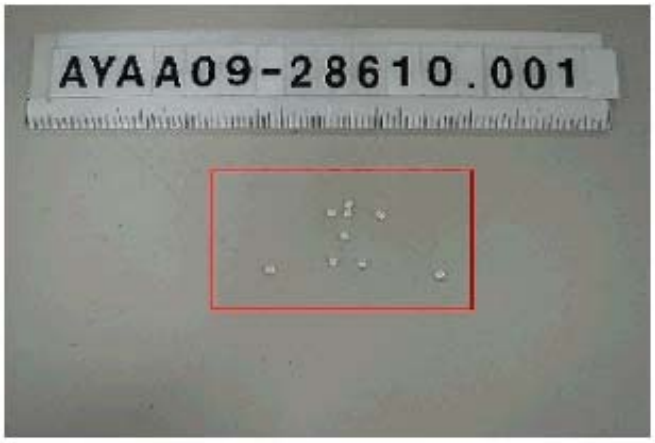
Sample Description : LED

Item No./Part No. : 3528 RED

Halogen Contents

Test Items	Unit	Test Method	MDL	Results
Bromine(Br)	mg/kg	With reference to ASTM D 7359-08 , IC	30	N.D.
Chlorine(Cl)	mg/kg	With reference to ASTM D 7359-08 , IC	30	N.D.
Fluorine(F)	mg/kg	With reference to ASTM D 7359-08 , IC	30	N.D.
Iodine(I)	mg/kg	With reference to ASTM D 7359-08 , IC	50	N.D.

Picture of Sample as Received:



*** End ***

NOTE: (1) N.D. = Not detected.(<MDL)
(2) mg/kg = ppm
(3) MDL = Method Detection Limit
(4) - = No regulation
(5) ** = Qualitative analysis (No Unit)
(6) Negative = Undetectable / Positive = Detectable

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 45 days only.

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Revision History
(Model : SPMRDT3215A0)

Date	Revision History	Writer	
		Drawn	Approved
2010.01.05.	New Version	W.H. Jung	Y.C. Kim